

Figure 1

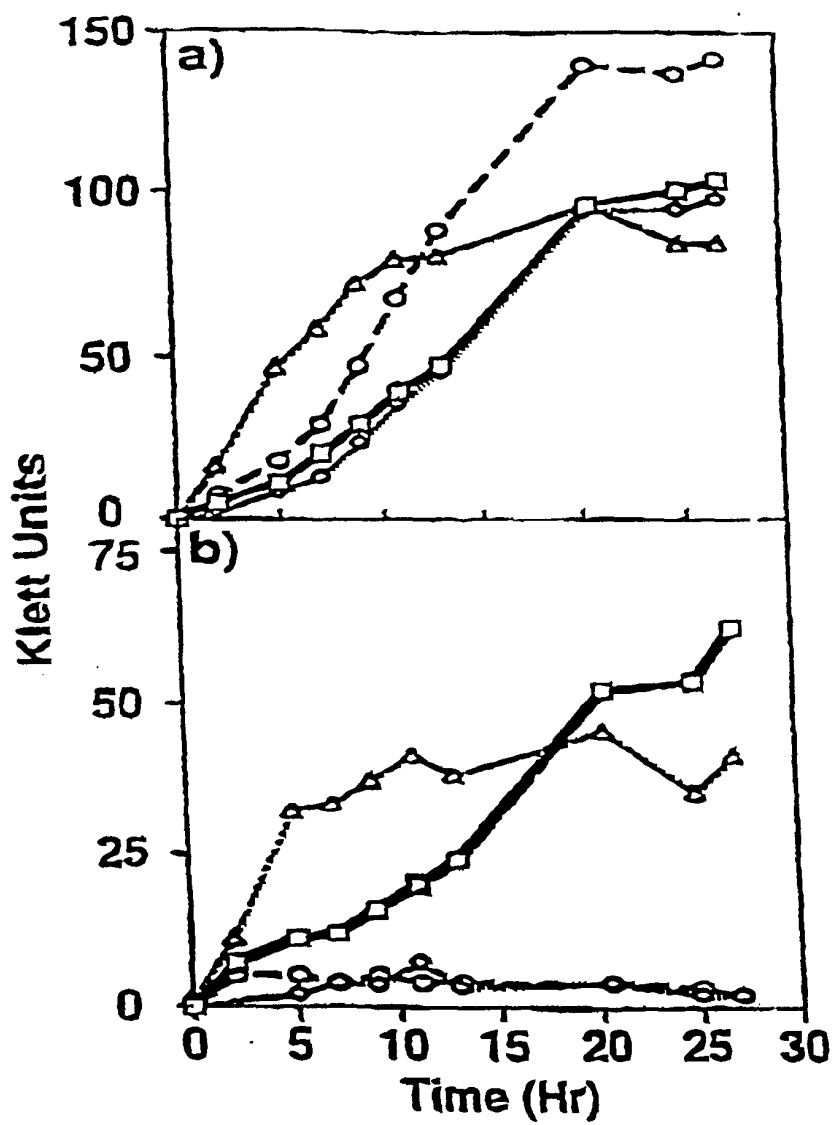


Figure 2

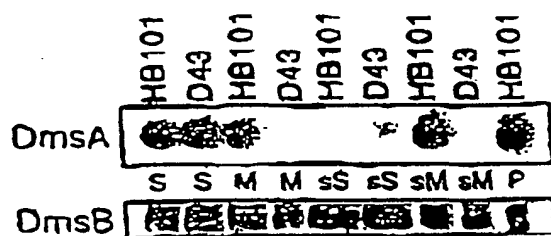
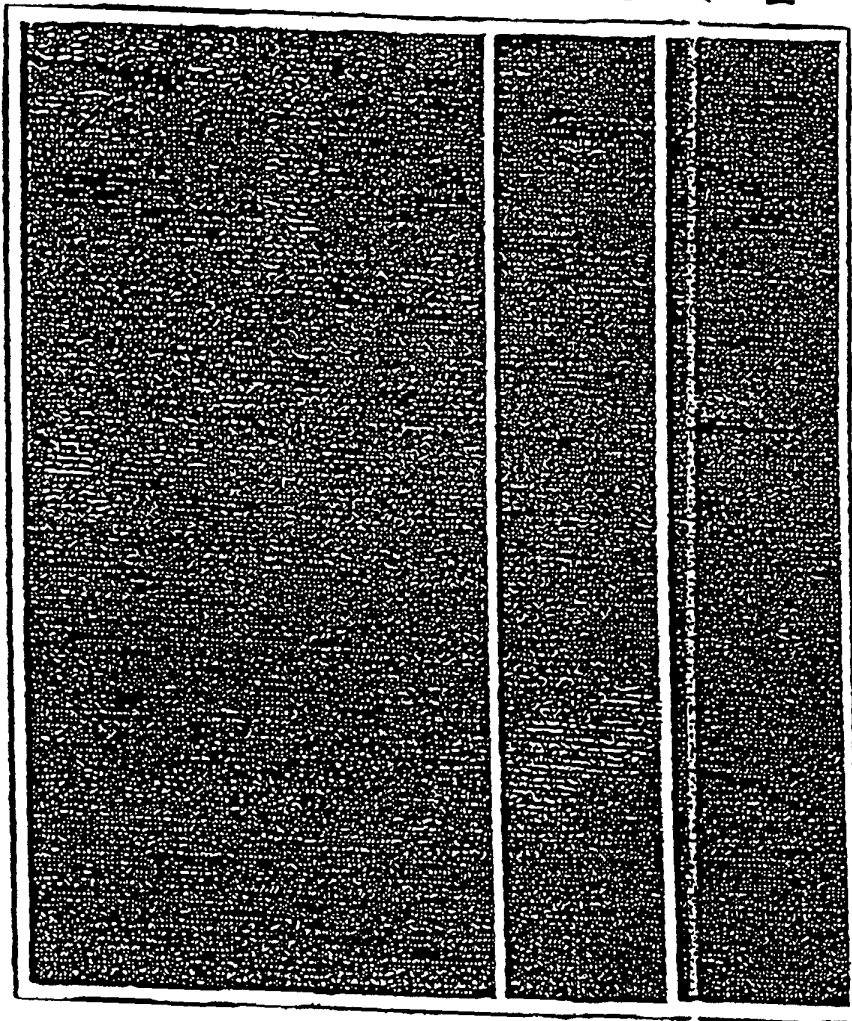


Figure 3

a) b) c)
1 2 3 4 5 6 1 2 1 2

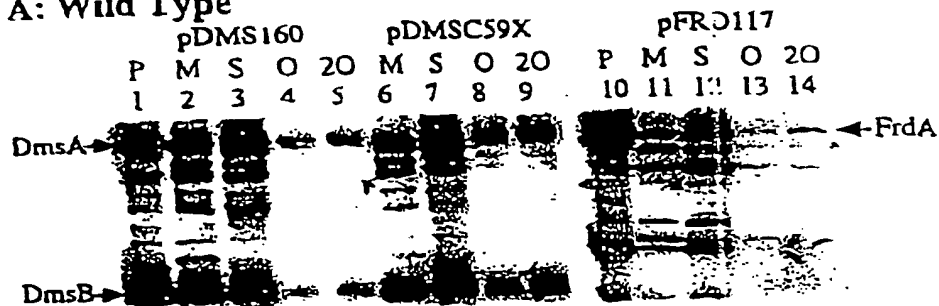


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Figure 4

A: Wild Type



B: D43

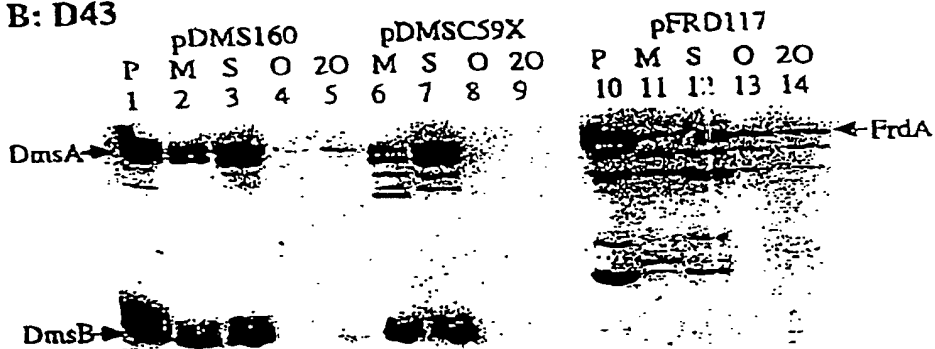


Figure 5

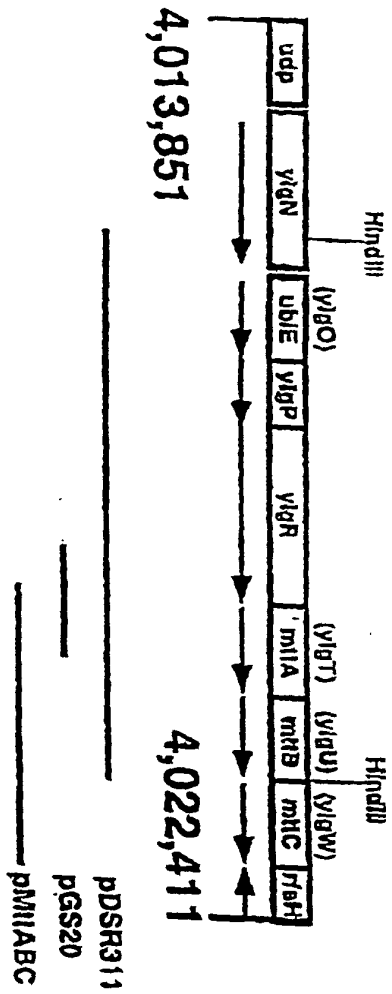
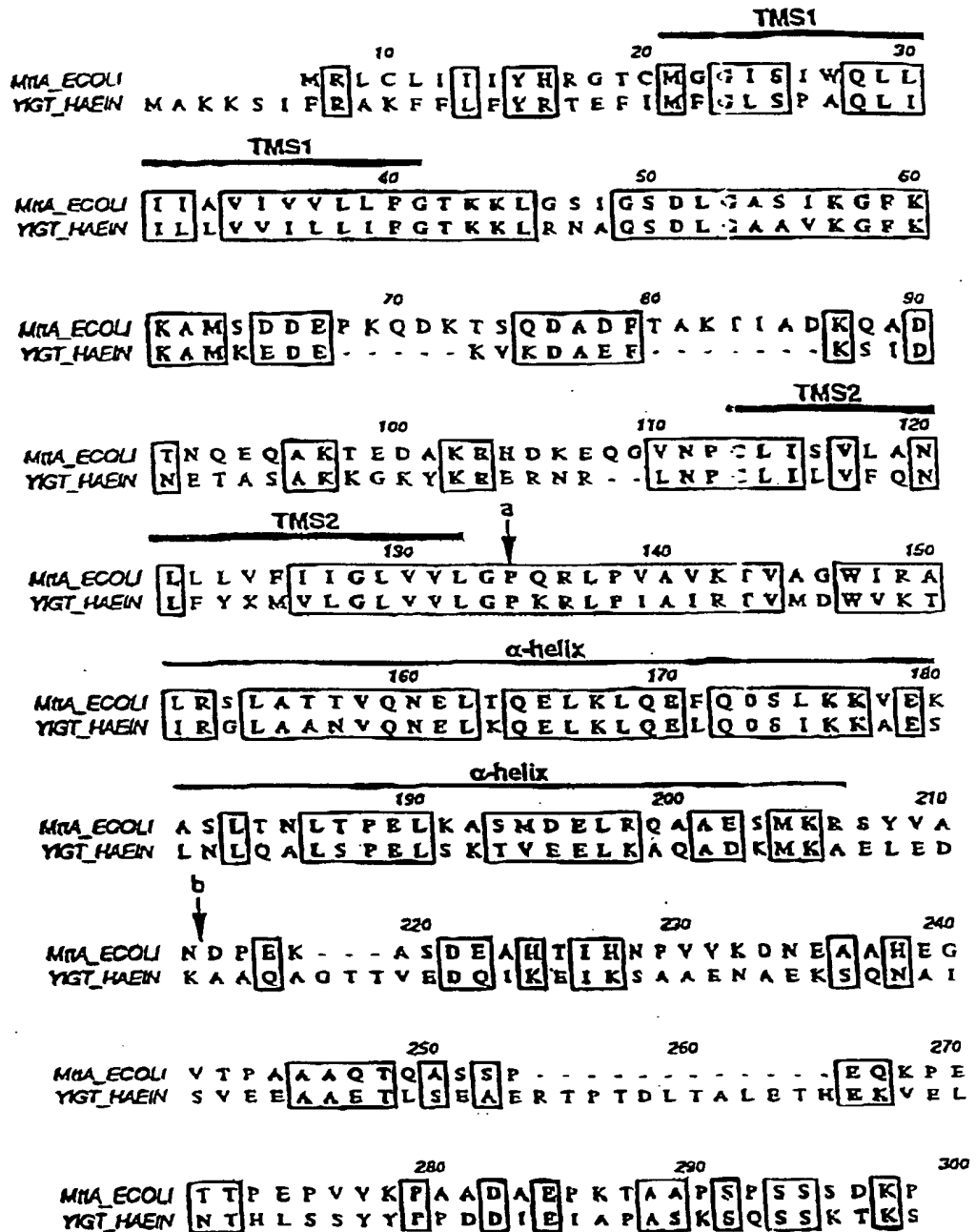


Figure 6



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Figure 7(A)

Sequence Range: 5000 to 9000

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5000      5010      5020      5030      5040      5050
TTCCTGGCTGGGTGCCACGATACCAACGTTCAACAGTTCGAATTTGCCATTTCGTACGGT

5060      5070      5080      5090      5100      5110
CTCTCAACCTATCTTTGAGAAACCCCTGGCCGAAATTCGTTTGGACATCTACTGTTAAA

5120      5130      5140      5150      5160      5170
TCTGTTTAAATACCGGGGCTCGCTTCAATATGCAAGTGCAGCCGCAACTCGTGTACTCCA

5180      5190      5200      5210      5220      5230
GAAACCCCTGCTCTACGTCGAAAGGGTAGGACGCCAGCTTTATCCGCAACTCGATTTATG

5240      5250      5260      5270      5280      5290
GAAACGGGGAAGCTTTCTCTGAGTCTGCTGATTAAGATCAGGTGGGTATCTCTCCCT

5300      5310      5320      5330      5340      5350
CGTGAGACCAATTAAACAAAAAGCCCGTTCTGCTCGAAAAAATCCGCAACTCGCTGA

5360      5370      5380      5390      5400      5410
ATTGCTTACGACAGTTTCGCCAGGGCAAGTATTACAGCACAGTGTGATAAGATTGC

5420      5430      5440      5450      5460      5470
CCGGCACTTCAGTCAAAATCATGTACGTCAGGGACAATCCCGTTATTTCTCGGAATTGG

5480      5490      5500      5510      5520      5530
CGCTACGTTACTATTAAGTGGCACATTCTGTGTCAGCCGACCTGATCGGGGCTGAT

5540      5550      5560      5570      5580      5590
GCCCGGCTCGTTAATGGCNDGTGGTCTGATCGCGTGTCTTCTGGTTCCGCCAAAAGAGG

5600      5610      5620      5630      5640      5650
CTGATTTTTCATCGCTCAAGCCGGGCGGTGTACGTATAATGGGCTTCTTTAATCAT
                                H R L C L I I>
                                ORF RF(3) >

5660      5670      5680      5690      5700      5710
CATCTACCAAGAGGAACATGTATGGGTGGTATCAGTATTTGGCAGTTATTCATTATGC
I Y H R G I C H G C I S I W Q L L I I A>
                                ORF RF(3) >

5720      5730      5740      5750      5760      5770
CGTCATCGTTGTACTGCTTTTGGCAACAAAAGCTGGCTCCATCGGTTCCGATCTTGG
V I V V L L F G T K K L G S I G S D L G>
                                ORF RF(3) >

5780      5790      5800      5810      5820      5830
TGGCTCGATCAAGGCTTTAAAAAGCAATGAGCGATGATGAAACCAAGCAGGATAAAC
A S I K C F K K A H S D D E P K Q D K I>
                                ORF RF(3) >

5840      5850      5860      5870      5880      5890
CAGTCAGGATGCTGATTTTACTGCGAAACTATCGCGATTAACCAAGGCGGATACGAATCA
S Q N A D E T A K T I A D K Q A D I H Q>
                                ORF RF(3) >

5900      5910      5920      5930      5940      5950

```

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Figure 7(B)

GGAACAGGCTAAAACAGAAGACCGGAAAGCGCCACGATAAAGAGCAGGTGAATCCGTGTTT
 E Q A K T E D A K R H D K E Q V N P C L>
 ORF RF(3) >

5960 5970 5980 5990 6000 6010
 GATATCGGTTTATGCGAACTTGGTATGGTGTTCATCATCGGCGCTCGCTTCCTGGCGCC
 I S V L A H L L L V F I I G L V V L C P>
 ORF RF(3) >

6020 6030 6040 6050 6060 6070
 GCAACCACTGCGCTGCGCGGTAAAMCGGTACCGCGCTGGATTTCGCGCGTTGCGTTCCT
 Q R L P V A V K T V A G W I R A L R S L>
 ORF RF(3) >

6080 6090 6100 6110 6120 6130
 GCGACAAACGGTGCAGAACCACTGACCCAGGACTTAAACTCCAGGAGTTTCAGGACAG
 A T T V Q N E L T Q E L K L Q E F Q D S>
 ORF RF(3) >

6140 6150 6160 6170 6180 6190
 TCTGAAAGGTTGAAAGCGCGAGCTCACTAACCTGACCGCGCAACTGAAAGCGTCCGAT
 L K K V E K A S L T N L T P E L K A S H>
 ORF RF(3) >

6200 6210 6220 6230 6240 6250
 CGATCAACTACCGCAGCTCGCGGAGTGCATGACCGCTTCTACGTTGCAACGATCCTGA
 D E L R Q A A E S H K R S Y V A N D P E>
 ORF RF(3) >

6260 6270 6280 6290 6300 6310
 AAAGCGGAGCGATGAGCGGACACCATCCATAACCGGTCGTCGAAAGATATGAAGCTCC
 K A S D E A H T I K W P V V K D R E A A>
 ORF RF(3) >

6320 6330 6340 6350 6360 6370
 GCATGAGCGGCTAACCGCTGCGCGTGCACAAACGCGCGGAGTTGCGCGGAAACAGAACCC
 H E G V T P A A A Q T Q A S S P E Q K P>
 ORF RF(3) >

6380 6390 6400 6410 6420 6430
 AGAAACCAAGCGCAAGCGCGCTGGTAAACCTGCTCGGAGCGCTGAACCGAAACCGCTCC
 E T T P E P V V K T A A D A E P K T A A>
 ORF RF(3) >

6440 6450 6460 6470 6480 6490
 ACCTTCCCGCTTGTGAGTGATAAACCGTAAACATGTCTGTAGAGATACCTCAACCGCTT
 H S V E D T Q P L>
 ORF RF(2) >

P S P S S S D K P>
 ORF RF(3) >

6500 6510 6520 6530 6540 6550
 ATCAGCGCATCTGATTGAGCTCGGTAAAGCGTGTGCTGAACTGCAATATCGCGGTGATCGTG
 I T B L I E L R K R L L H C I I A V I V>
 ORF RF(2) >

6560 6570 6580 6590 6600 6610
 ATATTCTGTGTCTGCTCTATTTCGCAATGACATCTATCACTCGGTATCGCGGCAATTC

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Figure 7(C)

I F L C L V Y F A N O I Y B L V S A P L >
ORF RF[2]

6620 6630 6640 6650 6660 6670
ATCAACGCTGCCCGAAGGTTCACGATCATCCGCACCTGGCGTCCGGTCTCTTT
I K Q L P Q G S T M I A T D V A S R F E >
ORF RF[2]

6680 6690 6700 6710 6720 6730
ACGGCGATCAAGCTCACCTTATTCCTGCTCCTGATTCTCTCAGCGCCGGTGATTCTCTAT
T P I K L T F W S L I L S A P V I L Y >
ORF RF[2]

6740 6750 6760 6770 6780 6790
CAGGTGTCGCCCATTTATCCGCCCAAGCGCTGTATAAGCATCAAGCTCCGGCTGGTGGCGG
Q V W A Y I A P A L Y K E E R R L V V P >
ORF RF[2]

6800 6810 6820 6830 6840 6850
CTCTGGTTTCAGCTCTCTCTGCTTTATATATGCCATCCGATTCGCCCTACTTGTGCTC
L L V S S S L L F T I G H A F A Y F V V >
ORF RF[2]

6860 6870 6880 6890 6900 6910
TTTCGGCTGGCATTTTGCTTCTCTCCCAATACCGCGCCGGAAGGGCTGCAGGTATCCACC
P R L A F G F L A H I A P E G V Q V S I >
ORF RF[2]

6920 6930 6940 6950 6960 6970
GACATCGCCAGCTATTTRAGCTTGTTATATGGCGCTGTTTATGGCGTTTGTGTCTCTCTI
D I A S Y L S F V M A L I N A F G V S F >
ORF RF[2]

6980 6990 7000 7010 7020 7030
GAAGTGGCGGTAGCAATTGCTGCTGCTGCTGGATGGCGATTACCTCCCGACAAGACTTA
E V P V A I V L L C W K I T G P E D L >
ORF RF[2]

7040 7050 7060 7070 7080 7090
CCCCAAAACCGCCCTATGCTGCTGCTGGTGCATTCCTGCTCGCGATGCTGCTGACGGCG
R K K R P Y V L V G A F V V G H L L T P >
ORF RF[2]

7100 7110 7120 7130 7140 7150
CCCGATGCTCTTCGCAAGCGCTGTTCGGATCCCGATGCTGCTGCTTTGAAATCGGT
P D V F S Q T L L A I P N Y C L F E I G >
ORF RF[2]

7160 7170 7180 7190 7200 7210
GTCTTCTCTCAGCTTTTACCTTCGGTAAGCGCGCAATCCGGACAGCAAAAAAGCACTT
V F F S R F T V C K E G R W R E E E W D A >
ORF RF[2]

7220 7230 7240 7250 7260 7270
GAAGCAGAAGCGAAAAAACAGTAGAATAAATTCACCGCCCGCTCAGCGCGCTTGTCTATA
R A E S E K T E >
ORF RF[2]

Figure 7(D)

7280 7290 7300 7310 7320 7330
 TGGAGTACAGGATGTTTCATATCGCGCTTAATTTGACCAGTTCCGAATTTCCGAAGACC
 M E Y R K F D I G V N L T S S Q F A K D>
 ORF RF(1)

7340 7350 7360 7370 7380 7390
 CTCATGATGTTGTACCGTCCCGCTTTTCACCGCGGAGTTAATCGGCTACTCATCACCGGCA
 R D O V V A C A F D A C V N G L L I T G>
 ORF RF(1)

7400 7410 7420 7430 7440 7450
 CTAAGCTCCCTCAAGCCAGCAGCCCAAAAGCTGCGCGCTCAGTATTCGTCCTGTTGGT
 T N L R E S Q Q A Q K L A R Q Y S S C W>
 ORF RF(1)

7460 7470 7480 7490 7500 7510
 CAAAGCGCGCGGTACATCCTCAGCAGCAGCCAGTCCCAAGCTCGGACTGAAGAAGCGA
 S T A G V R P R D S S Q W Q A A T E E A>
 ORF RF(1)

7520 7530 7540 7550 7560 7570
 TTATTCAGCTGCGCGCGCAGCAGAGTGGTGGGATGGTGAAATGTCGCTCGACTTTA
 I I E L A A Q P E V V A I G E C G L D F>
 ORF RF(1)

7580 7590 7600 7610 7620 7630
 ACCGCAACTTTTCGACCGCGGAAGAGCAGGAACCGCGCTTTTGTGTCGCGAGTACGCAATG
 W R N F S T P E E Q E R A F V A Q L R I>
 ORF RF(1)

7640 7650 7660 7670 7680 7690
 CCGCAGATTAAACATGCGCGGATTTATGCACTGTGCGATGCCAGGAGCGGTTTATGA
 A A D L W M P V F H E C R D A H E R F 4>
 ORF RF(1)

7700 7710 7720 7730 7740 7750
 CATTCCTGGAGCGCGTCCCTGGATAACTGCGCTGCTGCGCTTCATTCCTTTACCGGCA
 I L L E F W L D K L P G A V L E C F T G>
 ORF RF(1)

7760 7770 7780 7790 7800 7810
 CACCGCAAGAGATGCAAGCGCTCCGTCGCGCATGCAATTTATATCGGCAATACCGGTTGGG
 T R E E M Q A C V A E G I Y I G I T G W>
 ORF RF(1)

7820 7830 7840 7850 7860 7870
 TTTCCGATCAACGACCGGAGCTGGAGTCCCGCAACTTTTCCCGTTGATTCGCGCGGAA
 V C D E R R C L E L R E L L P L I P A E>
 ORF RF(1)

7880 7890 7900 7910 7920 7930
 AATTACTGATCAAACTGATGCGCGTATCTGCTCCCTGCGGATCTCAGCGCAAGCCAT
 K L L I E T D A P Y L L P R D L T P E S>
 ORF RF(1)

7940 7950 7960 7970 7980 7990
 CATCCCGCGCAACGAGCGCAAGCCATCTGCGCATATTTTCCAGCTATTCGCGCACTGGC

Figure 7(E)

S S R R N E P A H L R E I L Q R I A H W>
 ORF RF(1)

8000 8010 8020 8030 8040 8050
 GTGGAGAAGATGCCCGATGGCTGGCTGCCACCGGATGCTAATGTCAAAACACTGTTTG
 K G E D A A V L A A T T D A N V K T L F>
 ORF RF(1)

8060 8070 8080 8090 8100 8110
 GGATTGGCTTTAGAGTTTGGGGAACCTGGTATTCTTCACACTGTGCTTAATCTCTTTAT
 G I A F>

8120 8130 8140 8150 8160 8170
 TAATAAGATTAAAGCAATAGCATGGAGCGAGCTCACCATCGGGTTGGGTGAAAAATGGCT

8180 8190 8200 8210 8220 8230
 GAAAGCCTTCGAACCGGCTTGGTAATAATCACCTTATCACCGGATAAGGGGTGCGCG

8240 8250 8260 8270 8280 8290
 GATCGCAATGCTTTTGGTTTATATACCGATAGCTGATGAATAACCGCGATGGGACTA

8300 8310 8320 8330 8340 8350
 TCCCTGGCGACGGCGCAAGCGCACGAAGTGGCTGACACCGCGGGTGGCGTTGATAGTCC

8360 8370 8380 8390 8400 8410
 TGGTATGAATCACTTCTGGGTCAATTCCACAAACAGGTAGTTGGGGAACAATGGCTCAC

8420 8430 8440 8450 8460 8470
 TGACTGCAGTACGTTTCCACGGCAGGATTTTCCAGGGTGATCATCGGTGCCAGGCAAT

8480 8490 8500 8510 8520 8530
 TCACAGCTGTCTTTCGAGGTGTCTCGGCACGTTGAAGTTGCCCCGCTTGCAGTACA

8540 8550 8560 8570 8580 8590
 GTAATACCAAGATTCCATATGACTCTTATCCCTTTAATGGGGCGCAAGGATAGCANA

8600 8610 8620 8630 8640 8650
 AGCTTACCTAAGTTAATTAATTCCTGGGTTGGGTATACCTTCAGGTTACAGCTA

8660 8670 8680 8690 8700 8710
 ATTTAACAATTTACAGCATCCCAAGATGAAGCCGTATAATGCCCGCAGATTAGAGG

8720 8730 8740 8750 8760 8770
 CTACATCCACCCATGAAATATAAGGATTTACCGGACTTCTTCAGCTGCTTGACAGC

8780 8790 8800 8810 8820 8830
 AGGGTGAGCTAAAAGGATACCGTCCCGTGGATCCCATCTGGAAATCAGTCAATTC

8840 8850 8860 8870 8880 8890
 CTCACCCCACTTTCCTCCCGCTCCCGCTCCCGTCTTGTTCGAAAGCTTAAGCCACT

8900 8910 8920 8930 8940 8950
 CAATGCCCGTCTGTCAACCTGTTCCTACCCAAAGCCGCTGGGATGGGCAATGGGC

8960 8970 8980 8990 9000
 AGCAAGATCTTTGGCGCTGGGTGAAGTTCCTAATTAATG

11

Figure 8(A)

10 20 30

A
H106_ZEAMA MTFTANLLLPAPPFVPI SDVRRRLQLPPRV R
EC_ECOLI
NEC
IF13_RHOER
EST_ORF57
Y34_MYCLE
SLPY
AEIN
BACSU
ORF4_AZOCH

MALTLVM

40 50 60

H106_ZEAMA HCP R P C W K C V E W C S I Q T R M V S S F V A V G S R T
EC_ECOLI
SYNEC
ORF13_RHOER
PSEST_ORF57
Y34_MYCLE
HELPY
HAEN
BACSU
ORF4_AZOCH

MRLCLII I
GAIASPWVS VGT KLCYSRLNESFYPSNPLT
MAKKSIFRAKFFLF

70 80 90

H106_ZEAMA YHR - - - QTC MGGISIWQLLII AVIVVLLVFG
EC_ECOLI RRRNVICAS LFGVGAPEALVIGVVAALLVFG
SYNEC APN - - - PMN MGEISITKLLVVAALVLLVFG
ORF13_RHOER IEGIQLPGLIFVIAALLVFG
PSEST_ORF57 MGAMSPWHWAIVA LVVVLVFG
Y34_MYCLE MMGISVWQLLII LLIVVMLVFG
HELPY MGSLSPPWHVVLV VVVVLLVFG
HAEN MGGFTSIWHVVI LVVIVLLVFG
BACSU YRT - - - EFI MFGLSPAQLIIL LVVILLIFG
ORF4_AZOCH MPIGPGSLAVIA IVALLIFG
MGFGGSIWQLLII LLIVVMLVFG

100 110 120

H106_ZEAMA TKKLGSI GSD LGASIKGFKKAMSDDDEPKQD
EC_ECOLI PKGLAEVARN LGKTLRAEQPTIRELQDVSR
SYNEC TKKLR TLGGDLGAAIKGFKKAMND DD - AAA
ORF13_RHOER SKKLPEYGRSLGKALRQEQEASKEFBTBLK
PSEST_ORF57 TKRLRQLGSDLGSAINGFRKSVBD - - -
Y34_MYCLE AKKLPDAARS LGKSMRIFKSEBLREMOTEN
HELPY AKKIPELAKGLGSGIKNFKKAVKDDDE - BEA
HAEN TKKLRNAGSDLGAAVKGFKKAMKEDB - - KV
BACSU PKKLPELGAAGD DTLRBFKNATKGD - - -
ORF4_AZOCH TKRLKSLGSD LGDAIKGFRKSM DNEENKAP

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Figure 8(B)

		130	140	150
MsA	KTSQD - A - - - DFTAKTI	A	D	K
Hc106_ZEAMA	EFIRSTLERE	I	O	I
YBEC_ECOLI	KKGAD - V - - - DLQAEKLS	S	H	K
SYNEC	REAQNLE - - - KSVQIKAE	L	B	E
ORF13_RHOER	TPAPTAQ - - - SAPPPQS	A	P	A
PSEST_ORF57	- - - - - - - - - - - - -	-	-	-
YY34_MYCLE	- - - - - Q - - - AQASALE	T	P	M
HELPI	KNBP - - K - - - TLDAQAT	T	K	V
HAEIN	KDAEF - K - - - SIDNETA	S	A	K
BACSU	- - - - - - - - - - - - -	-	-	-
ORF4_AZOCH	PVEEQ - K - - - GQDHRGPGP	Q	G	R
		160	170	180
MsA	TEDAKRRHDK	B	Q	G
Hc106_ZEAMA	Q - - - - - - - - - - - - -	-	-	-
YBEC_ECOLI	- - - - - - - - - - - - -	-	-	-
SYNEC	- - - - - - - - - - - - -	-	-	-
ORF13_RHOER	P - - - - - - - - - - - - -	-	-	-
PSEST_ORF57	- - - - - - - - - - - - -	-	-	-
YY34_MYCLE	- - - - - - - - - - - - -	-	-	-
HELPI	- - - - - - - - - - - - -	-	-	-
HAEIN	- - - - - - - - - - - - -	-	-	-
BACSU	- - - - - - - - - - - - -	-	-	-
ORF4_AZOCH	MFDIG - - - - - - - - - - -	-	-	-
		190	200	210
MsA	GLVVLGPQR	L	P	V
Hc106_ZEAMA	- - - - - - - - - - - - -	-	-	-
YBEC_ECOLI	- - - - - - - - - - - - -	-	-	-
SYNEC	- - - - - - - - - - - - -	-	-	-
ORF13_RHOER	- - - - - - - - - - - - -	-	-	-
PSEST_ORF57	- - - - - - - - - - - - -	-	-	-
YY34_MYCLE	- - - - - - - - - - - - -	-	-	-
HELPI	- - - - - - - - - - - - -	-	-	-
HAEIN	- - - - - - - - - - - - -	-	-	-
BACSU	- - - - - - - - - - - - -	-	-	-
ORF4_AZOCH	ALLVLGP	B	E	R
		220	230	240
MsA	VQN	B	L	T
Hc106_ZEAMA	YTS	E	E	L
YBEC_ECOLI	- - - - - - - - - - - - -	-	-	-
SYNEC	- - - - - - - - - - - - -	-	-	-
ORF13_RHOER	QPQS	Q	H	T
PSEST_ORF57	- - - - - - - - - - - - -	-	-	-
YY34_MYCLE	- - - - - - - - - - - - -	-	-	-
HELPI	- - - - - - - - - - - - -	-	-	-

Figure 8(C)

LEN VFQNLFY
 ACSU
 RF4_AZOCH LKTVEREIGADBIK - - - QLHNBRILBLE

250 260 270
 MDA PELKASMDDEL RQAAESMKRSYVANDPEKAS
 Hcf106_ZEAMA QQQEEAPTTFR - SEDAPTSGGSSGPAAPAR
 YBEC_ECOLI
 SYNEC
 ORF13_RHOER
 PSEST_ORF57
 YY34_MYCLE
 HELPY
 HAEIN
 BACSU
 ORF4_AZOCH REMKQSLQPPAPSAPDETAASFATPPQPAS

280 290 300
 MDA DEAH TIHNPVVKDNEAAHBGVTPAAAQTQA
 Hcf106_ZEAMA AESDSDPNQVNKSQKAEGE R
 YBEC_ECOLI
 SYNEC
 ORF13_RHOER
 PSEST_ORF57
 YY34_MYCLE
 HELPY
 HAEIN
 BACSU
 ORF4_AZOCH PAAHSDKTPSP

310 320 330
 MDA SSPBQKPETTPEPVVKPAADAGPKTAAPSP
 Hcf106_ZEAMA
 YBEC_ECOLI
 SYNEC
 ORF13_RHOER
 PSEST_ORF57
 YY34_MYCLE
 HELPY
 HAEIN
 BACSU
 ORF4_AZOCH

340 350 360
 MDA SSSDKP
 Hcf106_ZEAMA
 YBEC_ECOLI
 SYNEC
 ORF13_RHOER
 PSEST_ORF57
 YY34_MYCLE
 HELPY

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Figure 9

4ttrB_ECOLI	I	T	H	L	I	E	E	L	R	K	R	L	N	C	I	I	A	V	I	V	I	-	F	L	C	L	V	Y	F	A	38			
YC43_PORPU	T	E	H	L	E	E	L	R	Q	R	T	V	F	V	F	I	F	F	L	L	A	-	A	T	I	S	F	T	Q	I	58			
YM16_MARPO	K	T	I	L	E	E	V	R	I	R	S	V	F	W	I	L	C	F	S	F	T	-	W	F	T	C	Y	W	F	S	34			
ARATH	B	T	I	L	G	E	V	R	I	R	L	I	G	L	O	L	T	-	W	F	T	C	Y	W	F	S	36							
Ymf16_RECAM	L	T	H	L	Y	E	R	I	R	L	I	Y	L	L	S	I	P	L	T	-	C	F	C	S	Y	Q	Y	K	F	58				
Y194_SYNY3	F	D	H	L	D	E	L	R	T	R	I	F	L	S	L	A	A	I	L	V	T	-	V	V	A	C	F	I	F	V	57			
YY33_MYCTU	V	D	H	L	T	E	L	R	T	R	L	L	I	S	L	A	A	I	L	V	T	-	I	F	G	F	V	W	Y	S	34			
HELPY	-	-	H	L	Q	E	L	R	K	R	L	M	V	S	V	G	T	I	L	V	A	-	F	L	G	C	F	H	F	W	39			
TigU_HAEIN	I	T	H	L	V	E	L	R	N	R	L	L	R	C	V	I	C	V	V	L	V	-	F	V	A	L	V	Y	F	S	40			
YcbT_BACSU	L	E	H	I	A	E	L	R	S	R	L	L	R	S	V	A	A	F	V	L	L	-	F	I	A	L	G	F	F	A	32			
YH25_AZOCH	V	A	H	L	T	E	L	R	S	R	L	L	R	S	V	A	A	F	V	L	L	-	F	A	A	L	F	F	Y	F	49			
ARCFU	I	A	L	I	V	I	V	V	S	S	L	F	F	T	F	O	A	N	I	V	V	-	G	K	I	I	G	D	L	F	P			
MtrB_ECOLI	T	D	V	A	S	P	F	F	T	P	S	I	K	L	T	F	M	V	S	L	I	L	S	A	P	V	I	L	Y	Q	V	91		
YC43_PORPU	L	A	P	G	E	Y	F	F	S	T	P	I	K	L	T	A	I	L	I	C	G	I	V	A	T	T	F	F	G	V	Y	Q	V	106
YM16_MARPO	T	Q	L	T	E	A	L	S	T	S	T	V	T	T	S	S	I	A	C	S	F	Y	F	L	F	P	F	F	L	S	Y	Q	I	87
ARATH	T	Q	L	T	E	A	F	S	T	S	T	V	A	T	S	S	I	A	C	S	F	Y	F	L	F	P	F	F	L	S	Y	Q	I	95
Ymf16_RECAM	T	D	L	I	E	A	F	I	T	S	T	V	I	K	L	S	I	I	V	G	I	Y	L	S	Y	P	F	I	F	L	Y	Q	I	83
Y194_SYNY3	L	S	P	G	E	F	F	F	V	S	V	K	V	A	G	Y	S	G	I	L	V	M	S	P	F	F	I	L	Y	Q	I	106		
YY33_MYCTU	T	A	P	F	D	Q	F	M	L	R	L	K	V	G	M	A	A	G	I	V	L	A	C	P	V	W	F	Y	Q	L	125			
HELPY	L	S	P	I	E	G	V	M	V	A	V	K	I	S	F	S	A	A	I	V	I	V	I	S	M	P	I	I	F	W	Q	L	81	
TigU_HAEIN	T	N	I	Q	T	P	F	F	T	P	I	K	L	T	A	I	V	A	I	F	I	S	M	P	I	Y	L	L	Y	Q	L	92		
YcbT_BACSU	F	N	L	T	D	P	L	Y	V	F	M	Q	E	A	F	I	I	G	I	V	L	T	S	F	V	I	L	Y	Q	L	90			
YH25_AZOCH	T	G	V	A	S	P	F	L	A	P	F	K	L	T	L	M	I	S	L	F	L	A	M	P	V	V	L	H	Q	V	85			
ARCFU	L	T	P	L	E	G	L	L	L	Y	L	K	I	S	L	A	V	G	I	A	A	A	L	P	Y	I	F	H	L	V	139			
MtrB_ECOLI	W	A	F	I	A	P	-	-	-	A	L	Y	K	H	E	R	R	L	V	Y	P	L	L	V	S	S	S	L	L	F	118			
YC43_PORPU	I	L	Y	I	L	P	-	-	-	G	L	T	N	K	E	R	K	V	I	L	P	I	L	I	Q	S	I	V	L	F	133			
YM16_MARPO	W	C	F	L	M	P	-	-	-	S	C	Y	E	Q	R	K	K	Y	N	K	L	P	Y	L	S	G	F	C	F	114				
ARATH	W	C	F	L	I	P	-	-	-	S	C	Y	G	E	Q	R	T	K	Y	N	R	F	F	Y	L	S	G	F	C	F	122			
Ymf16_RECAM	W	S	F	L	I	P	-	-	-	G	P	F	L	Y	E	K	K	L	F	R	R	L	C	L	T	S	I	F	L	Y	110			
Y194_SYNY3	I	Q	F	V	L	P	-	-	-	G	L	T	R	R	B	R	R	L	L	O	P	V	V	L	G	S	S	V	L	F	133			
YY33_MYCTU	W	A	F	I	T	P	-	-	-	G	L	Y	Q	R	E	R	R	F	A	V	A	F	V	I	P	A	A	V	L	F	152			
HELPY	W	L	F	I	A	P	-	-	-	G	L	Y	K	N	E	K	K	V	I	L	P	F	V	F	F	G	S	G	M	F	108			
TigU_HAEIN	W	A	F	I	A	P	-	-	-	A	L	Y	Q	H	E	K	R	M	I	Y	P	L	P	S	S	I	T	L	F	119				
YcbT_BACSU	W	A	F	V	S	P	-	-	-	G	L	Y	E	K	E	K	R	V	I	T	S	Y	I	P	V	S	I	L	L	F	117			
YH25_AZOCH	W	G	F	I	A	P	-	-	-	G	L	Y	Q	H	E	K	R	I	A	M	P	L	M	A	S	S	V	L	L	F	112			
ARCFU	L	T	A	L	R	E	R	G	V	I	T	P	S	P	R	K	T	S	A	P	K	Y	G	M	A	A	I	F	L	F	169			
MtrB_ECOLI	B	G	V	Q	V	S	T	D	I	A	S	Y	L	S	F	V	M	A	L	L	F	M	A	F	G	V	S	F	E	V	P	172		
YC43_PORPU	D	I	V	E	P	L	W	S	F	R	Q	Y	F	D	F	I	L	L	L	F	S	T	G	L	A	F	E	I	P	187				
YM16_MARPO	L	I	I	K	L	Q	P	K	I	F	D	Y	I	M	L	T	V	R	I	L	L	F	S	I	S	I	C	S	Q	V	P	173		
arab thal mtrB	L	M	I	K	L	Q	P	K	I	F	D	Y	I	M	L	T	V	R	I	L	L	F	S	I	S	S	V	C	S	Q	V	P	181	
Ymf16_RECAM	F	T	I	E	L	Q	A	K	I	H	B	Y	I	L	N	T	K	L	I	F	S	L	S	I	C	F	Q	L	P	170				
Y194_SYNY3	D	V	V	E	Q	L	W	S	I	D	K	Y	F	E	F	V	L	L	L	M	F	S	T	G	L	A	R	Q	I	P	187			
YY33_MYCTU	D	V	Q	V	T	A	L	S	G	D	R	Y	P	G	F	L	L	N	L	L	V	V	F	G	V	A	F	E	L	P	206			
HELPY	D	V	E	A	N	I	S	A	S	S	Y	V	S	F	F	T	R	L	I	L	G	F	G	V	A	F	E	L	P	162				
TigU_HAEIN	E	G	V	T	I	A	T	D	I	S	S	Y	L	D	P	A	L	L	L	F	L	A	F	G	V	C	F	E	V	P	173			
YcbT_BACSU	L	N	V	N	Q	V	I	G	I	N	E	Y	F	H	F	L	L	Q	L	T	I	P	F	E	G	L	F	Q	M	P	171			
YH25_AZOCH	E	G	V	A	M	M	T	D	I	G	Q	Y	L	D	F	V	L	T	L	L	P	A	F	G	V	A	F	E	V	P	160			
ARCFU	Q	G	A	I	P	L	Y	S	L	S	E	F	V	N	F	V	A	L	M	L	V	L	E	G	I	V	F	E	L	P	222			

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Figure 10

MC	TEEA	I	I	E	L	A	A	Q	-	-	P	E	V	V	A	I	G	E	C	G	L	D	F	N	R	N	F	104		
YCFH_ECOLI	DVED	L	R	R	L	A	A	E	-	-	E	Q	V	V	A	L	G	E	T	O	L	D	Y	Y	T	P	101			
YJYV_ECOLI	SLEQ	L	Q	Q	A	L	B	R	R	P	A	K	V	V	A	V	G	E	I	G	L	D	L	F	G	D	106			
METTH	LIGB	V	V	S	Q	I	E	S	N	I	D	L	I	V	A	V	G	E	T	Q	M	D	F	H	H	T	R	107		
Y009_MYCPN	AQAT	L	K	K	L	V	S	T	H	R	S	P	I	S	C	I	G	E	Y	G	F	D	Y	H	Y	T	K	105		
YCFH_Myctu	ARAB	L	B	R	L	V	A	H	-	-	P	R	V	V	A	V	G	E	T	G	I	D	M	Y	W	P	G	102		
ELPY	DES	L	F	E	K	F	V	G	H	-	-	Q	K	C	V	A	I	G	E	C	G	L	D	Y	Y	R	L	P	98	
YCFH_HAEIN	DAER	L	L	R	L	A	Q	D	-	-	P	K	V	I	A	I	G	E	I	G	L	D	Y	Y	Y	S	A	104		
YABD_BACSU	DLAW	L	K	E	L	S	A	H	-	-	E	K	V	V	A	I	G	E	M	G	L	D	Y	H	W	D	K	101		
SCHPO	-	E	A	L	A	N	K	G	K	A	S	-	G	K	V	V	A	F	G	E	F	G	L	D	Y	D	R	L	H	79
CAEEL	HISK	M	E	Q	F	F	V	B	H	E	R	D	I	C	V	G	E	C	G	L	D	H	T	I	S	Q	211			
Y218_HUMAN	QERN	L	L	Q	A	L	R	H	-	-	P	K	A	V	A	F	G	E	M	G	L	D	Y	S	Y	K	C	602		

MC	HCRDA	H	E	R	F	M	T	L	L	E	P	W	L	D	K	L	P	G	-	A	V	L	H	C	F	T	G	T	162
YCFH_ECOLI	HTRDA	R	A	D	T	L	A	I	L	R	E	E	K	V	T	D	C	G	-	G	V	L	H	C	F	T	B	D	160
YJYV_ECOLI	HSRRT	H	D	K	L	A	M	H	L	K	R	H	D	L	P	R	T	G	-	-	V	V	H	G	F	S	G	S	162
METTH	HARD	A	E	R	A	L	B	T	V	L	E	Y	R	V	P	B	V	-	-	I	F	H	C	Y	G	G	S	164	
Y009_MYCPN	HVRDV	H	B	R	I	Y	E	V	L	K	R	-	L	K	P	K	Q	P	-	V	V	F	H	C	F	S	E	D	161
YCFH_Myctu	HNRQAD	R	D	V	L	D	V	L	R	A	B	G	A	P	D	T	-	-	V	I	L	H	C	F	S	S	D	163	
HELPY	HIREAS	F	D	S	L	N	L	K	N	-	-	Y	P	K	A	F	-	-	G	V	L	H	C	F	N	A	D	159	
YCFH_HAEIN	HTRSAG	D	S	L	N	L	K	N	-	-	Y	P	K	A	F	-	-	-	G	V	I	H	C	F	T	B	T	161	
YABD_BACSU	HNRDAT	E	D	V	V	T	I	L	K	E	G	A	B	A	V	G	-	-	G	I	M	H	C	F	T	G	S	158	
SCHPO	HSRNA	E	N	D	F	F	A	I	L	E	K	Y	L	P	E	L	P	K	K	G	V	V	H	S	F	T	G	S	138
CAEEL	HSRSAA	R	R	T	I	E	I	L	L	B	C	H	V	A	P	D	Q	-	-	V	V	L	H	A	F	D	G	T	282
Y218_HUMAN	HCREA	D	E	D	L	L	B	I	M	K	K	F	V	P	P	D	Y	K	-	I	H	R	H	C	F	T	G	S	660

MC	ERRGLE	L	R	E	L	L	P	L	I	F	A	E	K	L	L	I	E	T	D	A	P	Y	L	L	P	213			
YCFH_ECOLI	RN-	A	E	Q	L	R	D	A	A	R	Y	V	P	L	D	R	L	L	V	E	T	D	S	P	Y	L	A	P	209
YJYV_ECOLI	PR-	A	S	K	T	R	D	V	I	A	K	L	P	L	A	S	L	L	L	E	T	D	A	P	D	M	P	L	213
METTH	S-	-	E	H	H	M	E	L	V	R	A	I	P	L	E	G	M	L	T	E	T	D	S	P	Y	L	S	-	212
Y009_MYCPN	KN-	A	K	N	L	Q	A	A	L	S	V	I	P	T	E	L	L	S	E	T	D	S	P	Y	L	A	P	217	
YCFH_Myctu	RT-	A	R	E	L	R	E	A	V	P	L	M	P	V	E	Q	L	L	V	E	T	D	A	P	Y	L	T	P	214
HELPY	KN-	A	K	R	L	V	B	I	L	P	K	I	P	K	N	R	L	L	L	E	T	D	S	P	Y	L	T	P	208
YCFH_HAEIN	KN-	A	E	A	I	R	E	V	I	R	Y	V	P	M	B	R	L	L	V	E	T	D	S	P	Y	L	T	P	212
YABD_BACSU	KN-	A	K	K	P	K	E	V	V	K	E	I	P	N	D	R	L	L	I	E	T	D	C	P	F	L	T	P	209
SCHPO	T-	-	E	E	N	L	B	V	V	R	A	I	P	L	E	K	M	L	L	E	T	D	A	P	W	C	E	V	187
CAEEL	S-	-	E	B	T	T	Q	L	I	B	S	I	P	L	S	Q	L	L	L	E	T	D	S	P	A	L	G	-	330
Y218_HUMAN	SS-	A	W	B	A	R	E	A	L	R	Q	I	P	L	E	R	I	I	V	E	T	D	A	P	Y	F	L	P	713

Figure 11(A)

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10      20      30      40      50      60
ATTCTGGCTGGGTGCCACCAGATACCAACGTTGAAGAGTTCGAATTTGCCATTTCGTACGG
70      80      90      100     110     120
TCGTGAACCTATCTTTGAGAAACCCCTGCCCGAAATTTGGTTTGGACATGTACTGTIAA
130     140     150     160     170     180
ATCTGTTTAATACGGCGCTGGCTTCAATATGGAAAGTCCAGCCGCAACTCGTGTACTCC
190     200     210     220     230     240
AGAAAACCCCTGCTCTACCTCGAAGGGGTAGGACGCCAGCTTTATCCGCAACTCGATTAT
250     260     270     280     290     300
GGAAAACGCCGAAGCCTTTCTCGAGTCTGGATTAAAGATCAGGTCCGTATTCCTCGGC
310     320     330     340     350     360
TGGTGACAGCATTTAAGAAAAAGCGCCGTTCTGGGTGAAAAATGCGCAGAACTGCCTG
370     380     390     400     410     420
AATTCGTTTACGACAGTTTGGCCAGGCAAGIATTACAGCACGCTGTTGATAAGATTG
430     440     450     460     470     480
CCCGGAGCTTCAGTCAATCATCTACGTCAGGCACAATCGGTTATTTCTCGGAATTG
490     500     510     520     530     540
CGCCTACGTTAGIATTAAGTGGCACATCTCTGTTGGTCAGCCACCTGAATCGGGGCTGA
550     560     570     580     590     600
TGCCCGGCTGGTTAATGGCAGCTGGCTGTGATCGCTGGTTTGTGGGTTGGCGCAAAACAC
610     620     630     640     650     660
GCTGATTTTTCATGCCTCAGGCGCGCGCTGTAACGTATTAATGCGCGCTTGTTTAATCA
                                     M R L C L I>
670     680     690     700     710     720
TCAITCACCACAGAGGANCATGTATGGGTGGIATCAGTATTGGCAGTTAATGATTATTC
I I I R R G T C M C C I S I W Q L L I I>
730     740     750     760     770     780
CCCTCATCGTTGTACTGCTTTTGGCACCAAAAGCTGGGCTCCATCGGTTCGGATCTTG
A V I V V L L F C T K K L G S I G S D L>
790     800     810     820     830     840
GTGGTTCGATCAAGGCTTTAAAAAGCAATGAGCGATCATGACCAAGCAGGATAAAA
G A S I K G F K K A M S D D E P K Q D K>
850     860     870     880     890     900
CCAGTCAGGATGCTGATTTTACTGGGAAACTATCGCGATAAGCAGGCGGATACGAAATC
T S Q D A D F I A K T I A D K Q A D I N>

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Figure 11(B)

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      910      920      930      940      950      960
AGGAACAGCGCTAAACAGAAAGACGCCAAGCGCCACGATAAAGAGCAGGTGTAATCCGIGT
O E Q A K I E D A K R H D K E Q V>      V>
>

      970      980      990      1000      1010      1020
TTCATATCGGTTTACGCAACTGCTATTGCTGTCATCATCGGCTCGTTCGTTCTCGGGC
F D I G F S E L L L V F I I G L V V L G>
>

      1030      1040      1050      1060      1070      1080
CCCAACGACTGCCCTGTGCGCGTAAACCGGTAGCGGGCTGGATTCCGCGGTTTCGGTTCAC
P Q R L P V A V K I V A G W I R A L R S>
>

      1090      1100      1110      1120      1130      1140
TGGCCACAACCGCTCGCAACCACTGACCCAGGAGTTAAACTCCAGGAGTTTCAGGACA
L A T T V Q N E L T Q E L K L Q E F Q D>
>

      1150      1160      1170      1180      1190      1200
GTCTGAAAAAGCTTCAAAAGCGGAGCTCCTAACCTGACGCCCGAACTCAAAAGCGTCCA
S L K K V E K A G L T N L T P E L K A S>
>

      1210      1220      1230      1240      1250      1260
TCCATCAACTACGCCAGCGCCCGGAGCTCGATGAAGCGTTCTTACCTTGCAAAACCATCTG
M D E L R Q A A E S K K R S Y V A N D P>
>

      1270      1280      1290      1300      1310      1320
AAAGGGCAGCGATGAAGCCACACCATCCATAACCGGTGGTGAAGATAATCAACCTC
E K A S D E A H T I H N P V V K D N E A>
>

      1330      1340      1350      1360      1370      1380
CCCATGAGGGCGTAACCGCTGCCCTGCACAAAGCAGGCGAGTTCGCCCGGAACAGAAAC
A H E G V T P A A A Q T Q A S S F E Q R>
>

      1390      1400      1410      1420      1430      1440
CAGAAACCACGCCAGAGCGCGTGGTAAACCTGCTGCGGACGCTGAACCGAAGAACCGCTG
P E T T P E P V V K F A A D A E F K T A>
>

      1450      1460      1470      1480      1490      1500
CACCTTCCCTTCTCTCAGTGATAAACCGTAACATGCTGTGTAGAGTACTCAACCGCT
      N S V E D I Q P L>
A P G P S S S D R P>
>

      1510      1520      1530      1540      1550      1560
TATCAGCCATCTGATGAGCTGGTAAGCGTCTGCTGAACCTGATTATCGCGGTGATCGI
I T H L I E L R K R L L W C I I A V I V>
>

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Figure 11(C)

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1570      1580      1590      1600      1610      1620
GATAITCCGTGTCTGGTCTATTTCCCAATGACATCTATCACCTGGTATCCGGCCATT
I F L C L V Y F A N D I Y H L V S A P L>
>

1630      1640      1650      1660      1670      1680
GATCAAGCAGTTGCCGCAAGGTTCAACGATGATCGCCACCGACGTGGCTCGCCGTCTCT
I K Q L P Q G S T M I A T D V A S P F F>
>

1690      1700      1710      1720      1730      1740
IACCCCGATCAAGCTGACCTTTATGGTGTGGTGTGATTCTGTCAAGCGCGGTGATTCTCTA
T P I K L T F M V S L I L S A P V I L Y>
>

1750      1760      1770      1780      1790      1800
TCAGGTGTCCGCAATTTATCGCCCCAGCGCTGTATAGCATGAACGTGCGCTCGGTGGTCC
Q V W A F I A P A L Y K H E R R L V V P>
>

1810      1820      1830      1840      1850      1860
GCTGCTGCTTTCAGCTCTCTGCTGTTTATATCGGCATGGCATTCGCTACTTTGTGGT
L L V S S S L L P Y J C M A F A Y F V V>
>

1870      1880      1890      1900      1910      1920
CTTTCGGCTGGCATTTCGCTTCCTTGCCAATACCGCGCCGGAAGGGTGACCGTATCCAC
P P L A F G F L A N T A P E G V Q V S T>
>

1930      1940      1950      1960      1970      1980
CGACATCCCGAGCTATTTAAGCTTCGTTATGGCGCTGTTTATGGCGTTTCGCTCTCTCTT
D I A S Y L S F V M A L F M A F G V S P>
>

1990      2000      2010      2020      2030      2040
TGAAGTCCCGGTAGCAATTGTGCTGCTGTGCTGGATGGGGATTACCTCCGCCAAGACTT
E V P V A I V L L C W H G I T S F E D L>
>

2050      2060      2070      2080      2090      2100
ACGCAAAAAACGCCCGTATGCTGCTGGTTGGTGCATTGCTGTGGGATGTTCTGTACCCC
R K K R P Y V L V G A F V V G M L L T P>
>

2110      2120      2130      2140      2150      2160
GCGCGATGCTCTCTCGCAACGCTGTGTGGCGATCCCGATGTCGTCGTTTGAATCCG
P D V F S Q T L L A I P M Y C L F E I G>
>

2170      2180      2190      2200      2210      2220
TGTCTTCTCTCAGCTTTTACGTTGGTAAAGGGCGAAATCGGGAGAGGAAACGACGC
V F F S R F Y V G K C R H R E E E N D A>
>

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Figure 11(D)

2230 2240 2250 2260 2270 2280
TGAAGCAGAAAGCGAAAAAC7GAAGAA7AAAT7CAACCGCCCGTCAGGCGCGGTTCAT
E A E S E K T E D>

2290 2300 2310 2320 2330 2340
ATGGACTACAGGATGTTTATATCGGGGTTAATTIGACCGAGTTCGCAATTCGGAAGAC
M E Y R M F D I G V N L T S S Q P A K D>

2350 2360 2370 2380 2390 2400
CGTGATGATGTTGTAGCGTGGCTTTTGACGCGGGAGTTAATGGCTTACTCATCACCGCG
R D D V V A C A F D A G V N G L L I T G>

2410 2420 2430 2440 2450 2460
ACTAACCTGCGTGAAGCCACACCGCCGAAAGCTGGCGCGTCAGTATTGCTCTCTGG
T N L R E S Q Q A Q K L A R Q Y S S C W>

2470 2480 2490 2500 2510 2520
TCAACGCGCGCGGTACATCCTCAGACACGACGAGTGGCAAGCTGGAGTGAAGAGCG
S T A G V H P H D S S Q R Q A A T E E A>

2530 2540 2550 2560 2570 2580
ATTATTGAGCTGCGCGCGCAGACGAGTGGTGGGATTGGTGAATGTTGCTCTCGACTTT
I I E L A A Q P E V V A I G E C G L D F>

2590 2600 2610 2620 2630 2640
AACCGCAACTTTTCGACCGCGGAGAGCAGGAAACGCGCTTTGTTGCCCGAGTACGCATT
N R N F S T P E E Q E R A F V A Q L R I>

2650 2660 2670 2680 2690 2700
GCCGCGAGATTAAACATGCCCGTATTTATGCACTGTCCGATGCCACGACCGGTTATG
A A D L N M P V F W H C R D A R E R F M>

2710 2720 2730 2740 2750 2760
ACATTGCTGGAGCCCTCGCTGGATAAATGCGCTGGTGGCTTCTTCAATTGTTTACCGCC
T L L E F W L D K L P C A V L R C F T G>

2770 2780 2790 2800 2810 2820
ACACGCGAAGAGATGCAAGCGTGGTGGCCCATGGAA7TATATCGGCATTACCGGTTGG
T R E E H Q A C V A R G I Y I G I T G W>

2830 2840 2850 2860 2870 2880
GTTTGGATGAACGACCGCGACTGCACTGCCGAGCTTTTCCGTTGATTCGCGCGGAA
V C D E R R G L E L R E L I P L I P A E>

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Figure 11(E)

2890	2900	2910	2920	2930	2940
AAATTACTGATCGAAACTGATGCGCGTATCTCTCCCTCGCGATCTCAAGCCAAAGCCA					
K L L I E T D A P I L L P R D L T P K P>					
<hr/>					
2950	2960	2970	2980	2990	3000
TCATCCCCGGCAACCAAGCCAGCCCATCTGCCCCATATTTTGAACGTAITGCCCACTGG					
S S R R W E P A H L P H I L Q R I A H W>					
<hr/>					
3010	3020	3030	3040	3050	3060
CGTGGAGAAATGCGGCATGGCTGGCTGCCACCAAGGATGCTAATGCCAAAACACTGTTT					
R G E D A A W L A A T T D A N A K T L F>					
<hr/>					
3070	3080	3090	3100	3110	3120
GGGATTCGGTTTATAGATTTCGGAACTCGGTATCTTCACACTGTGCTTAATCTCTTTA					
G I A F>					
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